described in the section and includes U.S. 95 through Tonopah, Goldfield, and Beatty, is one of the routes evaluated as a sensitivity analysis. For this route, DOE estimated the total dose over 24 years to the population along the sections of Interstate-80, U.S. 93, U.S. 6, and U.S. 95 that make up the total route in the State would be about 900 person-rem. A dose of 900 person-rem to the affected population would be estimated to result in a 45-percent chance of 1 latent cancer fatality in the population over the 24 years of operations. The information was compiled to illustrate the sensitivity of impacts nationally and in Nevada to the potential use of different routes in Nevada. The analysis used State-specific data for rates of accidents on primary highways in Nevada for the segments of trips analyzed in these cases. The analysis also used route-specific data such as length and population within 800 meters (about 2,600 feet) of the route provided by a Geographic Information System analysis. To estimate the risks, DOE used accepted methods and data that it has used in other recent environmental documents.

8.5.3 (12548)
Comment - EIS001157 / 0009
A heavy-haul route through North Las Vegas and the Las Vegas Valley is not recommended. The costs of using such routes in terms of congestion and decreased air quality were not adequately addressed in the study.

Response
At this time, the heavy-haul truck implementing alternatives for transporting spent nuclear fuel and high-level radioactive waste to the proposed repository are conceptual. Section 2.1.3.3.3.2 of the EIS shows a concept for such a heavy-haul truck. Proposed road upgrades to allow use of such trucks, such as improvements to pavement and construction of turnouts and truck passing lanes, would mitigate impacts on congested roads, traffic flow, and highway infrastructure. In addition, Section 6.3.3 discusses impacts of implementing and using each of the proposed heavy-haul truck transportation implementing alternatives including potential impacts on the air quality in the Las Vegas air basin. However, before DOE used a heavy-haul truck transportation implementing alternative it would work with the State of Nevada to conduct engineering and environmental studies that would support detailed design and construction of upgrades to highways.

DOE believes that the EIS provides the environmental impact information necessary to make certain broad transportation-related decisions, namely the choice of a national mode of transportation outside Nevada (mostly rail or mostly legal-weight truck), the choice among alternative transportation modes in Nevada (mostly rail, mostly legal-weight truck, or heavy-haul truck with use of an associated intermodal transfer station), and the choice among alternative rail corridors or heavy-haul truck routes with use of an associated intermodal transfer station in Nevada. DOE has identified mostly rail as its preferred mode of transportation, both nationally and in Nevada. At this time, however, the Department has not identified a preference among the five candidate rail corridors in Nevada.

8.6 Rail Transport

8.6.1 DEDICATED TRAINS

8.6.1 (223)
Comment - 13 comments summarized
A number of commenters provided views on the type of train service that should be used for the transportation of spent nuclear fuel and high-level radioactive waste. There was a consensus among the commenters that dedicated trains should be used rather than general freight service; commenters listed the advantages of dedicated trains. The commenters stated that the Draft EIS does not make a decision between dedicated trains and general freight service. Several commenters indicated that DOE should state in the EIS whether the EIS is intended to support the decision between dedicated and general freight trains. One commenter suggested DOE should include the use of general freight and dedicated trains as separate alternatives in the description of the Proposed Action in the EIS.

Response
As indicated in the EIS, DOE believes that the mostly rail case, in which more than 95 percent of spent nuclear fuel and high-level radioactive waste would be shipped by rail, would most closely approximate the actual mix of truck and rail shipments. In addition, DOE has identified mostly rail as its preferred mode of transportation, both nationally and in Nevada. At this time, however, the Department has not identified a preference among the five candidate rail corridors in Nevada.

DOE could decide to use a dedicated train that carried only the material being shipped to Yucca Mountain, or could elect to move the spent nuclear fuel and high-level radioactive waste in general freight. If the material was shipped as general freight, the position of the spent nuclear fuel or high-level radioactive waste car in the train would be regulated by 49 CFR 174.85. This regulation requires that railcars placarded "radioactive" must be separated from a locomotive, occupied caboose, or carload of undeveloped film by at least one nonplacarded car, and it may not be placed next to other placarded railcars of other hazard classes. Section J.2.3 of the EIS presents an assessment of impacts of using dedicated trains to transport spent nuclear fuel and high-level radioactive waste. Based on current information from the U.S. Department of Transportation and the Association of American Railroads, it is the Department's opinion that there is no clear advantage for using either dedicated trains or general freight service.

DOE has not determined the commercial arrangements it would request from the railroads, including the use of dedicated or general freight trains, nor is the EIS intended to develop the scheduling and cost information necessary to make this determination. DOE recognizes the different attributes of dedicated trains and general freight service. DOE believes that general freight service, and dedicated train service are both capable of meeting the performance objectives of 10 CFR 73.37(a)(1) based on successful completion of past shipments of spent nuclear fuel by rail.

8.6.1 (402)
Comment - EIS000088 / 0002
Remember those trucks that delivers those nuclear waste from throughout the world and they go over there to that Nevada Test Site.

When they dump their load, they come on down here to California and go pick up your food. How much radiation is on that truck?

Response
The spent nuclear fuel that would be transported to a repository by truck would be contained in sealed casks. This would prevent the flatbed trailers used to transport the casks from becoming contaminated. In addition, the trucks would be checked for contamination prior to being allowed to leave the repository facility. It is not likely that these particular trucks would be used for any other purpose.

8.6.1 (4464)
Comment - EIS001232 / 0008
Is the proposed rail line to be a single use line or will it have other potential uses?

Will the rail roads handle these shipments as dedicated cargo or will they be shuffled from rail line to rail line and possibly lost?

Will there be buffer zones along the tracks?

Response
Decisions on whether or not to build a branch rail line, management of such a line, and other potential uses would be addressed after a decision on the suitability of the repository site. As discussed in Section 2.1.3 of the EIS, the conceptual design used in preparing the EIS assumed a single set of tracks and rail sidings. Sidings would be an average of 20 miles apart and approximately 0.5 kilometer (0.3 mile) long (see DIRS 154822-CRWMS M&O 1998). Should the mostly rail alternative be selected, additional, more detailed studies and designs would be conducted for the particular corridor and alignment identified. The need for additional sets of tracks and rail sidings would be evaluated during this design stage. Additional National Environmental Policy Act reviews, as required, would be conducted at that time.

A qualitative comparison of attributes of general rail-freight to dedicated train service in Table J-25 and in Section J.2.3 of the EIS, which is based in part on results of a recent U.S. Department of Transportation study, does not indicate a clear advantage for the use of either type of rail service. Thus, impacts discussed in the EIS are estimated based on typical railroad operations. In these operations, railroads transport freight cars, including cars carrying hazardous materials, along with other freight in trains that average 67 cars in length. DOE believes the analysis presented in the EIS supports use of either general-rail freight or dedicated-train service.

DOE's Draft Request for Proposals for Regional Servicing Contractors (see Appendix M of the EIS), states that contractors could be directed to use dedicated train service where it can be demonstrated to enhance operations efficiency and cost-effectiveness.

The branch rail line would be built following applicable Federal Railroad Administration, American Association of Railroads, and State of Nevada requirements.

8.6.2 BRANCH RAIL LINE CONSTRUCTION

8.6.2 (137)
Comment - 3 comments summarized
Commenters expressed concern with the estimated time to complete preconstruction activities associated with branch rail line construction, including environmental reviews and approvals, acquisition of rights-of-way, resolution of Native American tribal rights issues, and any associated legal issues. In addition, commenters expressed concern with the estimated time to complete branch rail line construction activities due to difficult terrain, environmental sensitivity, and unidentified Native American tribal cultural resources. Commenters believed that the estimated time for construction is optimistic and underestimates the difficulty of construction. A commenter noted that the EIS failed to provide a detailed description of rail construction activities and impacts.

Response
To ensure that the EIS analyses reflect the latest reasonably available information, DOE has incorporated information that has become available since the publication of the Draft EIS or modified existing information to accommodate conditions likely to be encountered over the life of the Proposed Action. For example, the EIS now includes additional and more detailed mapping of minority populations, and additional mapping and information that describes the proximity of tribal lands and cultural and ceremonial areas to candidate rail corridors in Nevada.

The cost estimates and schedules for the construction of branch rail lines were prepared after surveying the candidate corridors, investigating the topography, and reviewing potential environmentally and culturally sensitive areas. The conceptual design for rail implementing alternatives, the "Rail Alignments Analysis," attempted to minimize impacts to areas of known environmental concern or archaeological significance (including Native American cultural resources) by choosing corridor alignments that minimized or eliminated crossing of known sensitive areas (DIRS 131242-CRWMS M&O 1997). These corridor alignments include variations that could mitigate environmental or engineering issues. The analysis was then used in the development of a detailed cost estimate for rail construction, the *Nevada Transportation Study Construction Cost Estimate* (DIRS 154822-CRWMS M&O 1998). The construction cost estimates considered the cut and fill operations necessary to traverse the terrain associated with each route. Through the use of the estimated worker-hours for construction activities contained in this study rail construction schedules were developed (DIRS 155356-CRWMS M&O 1999) for conservative estimates of the duration of rail construction. Rail construction was estimated to take from 3 years and 4 months to 3 years and 10 months on a normal construction schedule.

DOE has identified mostly rail as its preferred mode of transportation, both nationally and in Nevada. If the Yucca Mountain site was approved, DOE would issue at some future date a Record of Decision to select a mode of transportation. If, for example, mostly rail was selected (both nationally and in Nevada), DOE would identify a preference for one of the rail corridors in consultation with affected stakeholders, particularly the State of Nevada. A similar process would occur in the event DOE selected heavy-haul truck as its mode of transportation in Nevada. Other transportation decisions, such as the selection of a specific rail alignment within a corridor, would require additional field surveys, State and local government and tribal consultations, environmental and engineering analyses, and appropriate National Environmental Policy Act reviews.

Because DOE cannot anticipate the length of any agency delays or legal challenges, including issues related to Native American tribal treaty lands, contingencies were not placed in estimated activity durations for preconstruction activities.

8.6.2 (186)
Comment - 18 comments summarized
Commenters stated that the EIS did not provide sufficient information on branch rail line system specifications, construction activities, and operations to allow the complete assessment of impacts and risks as required under National Environmental Policy Act. Other commenters asked what the costs would be to construct the five rail routes and which of the five could be constructed at the least cost. Commenters stated that the EIS did not contain sufficient information on branch rail line system specifications, including rail weight, tie materials, grade crossing separations, road crossings and crossing signals, overpasses, administration and maintenance facilities (including any remote water supply and sanitation specifications), seismic standards, flood standards, train control signal systems, platform dimensions, ditch dimensions, bench dimensions, and ballast and sub-ballast requirements. Other commenters questioned what the fencing specifications would be, including location and type, because this would affect the ability of wildlife to cross the tracks. Commenters stated that the EIS did not contain sufficient information on branch rail line construction activities, including defining what the buffer zone would be during construction to protect human health and safety, defining cut and fill requirements, and identifying sources for ballast and sub-ballast material. Commenters stated that the quarrying of ballast and sub-ballast materials, the reclamation of ballast and sub-ballast source areas, the installation of water wells and their locations, and construction and safety oversight by State and Federal agencies were not addressed in the EIS. Finally, commenters stated that the EIS did not contain sufficient information on rail branch line operations, including safety oversight of rail line operations by Federal and State agencies, to allow the complete assessment of impacts and risks. Another commenter is interested in whether union labor would be required to construct the branch rail line.

Response
If the Yucca Mountain site was approved, DOE believes that the EIS provides the environmental impact information necessary to make certain broad transportation-related decisions, namely the choice of a national mode of transportation outside Nevada (mostly rail or mostly legal-weight truck), the choice among alternative transportation modes in Nevada (mostly rail, mostly legal-weight truck, or heavy-haul truck with use of an associated intermodal transfer station), and the choice among alternative rail corridors or heavy-haul truck routes with use of an associated intermodal transfer station in Nevada. However, follow-on implementing decisions, such as the selection of a specific rail alignment in a corridor, would require additional field surveys, State and local government and Native American tribal consultations, environmental and engineering analyses, and appropriate National Environmental Policy Act reviews.

If the site was approved, transportation system specifications would be developed during detailed design activities. Specifications for items such as administration and maintenance facility and any associated remote water supply and sanitation needs, train control signal systems, and road crossing signals would be developed during these activities. Detailed field studies and geotechnical work would be required for development of specifications for seismic, flood, platform dimensions, ditch dimensions, bench dimensions, ballast requirements, and sub-ballast requirements. Specifications for grade crossing separations, road crossings, fencing locations, and fencing type would be developed in conjunction with government agency consultations, environmental analyses, and any necessary National Environmental Policy Act reviews, which would be conducted at the time of detailed design activities.

Based on standard engineering practices, DOE developed assumptions for the branch rail line conceptual designs analyzed in the EIS (DIRS 131242-CRWMS M&O 1997). In addition, conceptual engineering designs were developed for each of the rail corridors. These conceptual designs are referenced in the EIS and are available to the public. They incorporate assumptions based on regulatory requirements, established engineering practices, and existing railroad design. The documents contain sufficient design information to allow estimation of the environmental impacts of constructing and operating a branch rail line, but were not intended to provide specifications and detailed design descriptions, such as the information requested by the commenters, for constructing, maintaining, and operating a branch rail line. Additional information on operational protocols is provided in Section M.3 of the EIS.

DOE assumed for the purpose of the EIS that operations of trains on a branch rail line and the maintenance of the line would be conducted in compliance with applicable regulations and standards for railroads and that the safety of operations would meet or exceed that of mainline railroads in the United States.

The conceptual design assumed a rail weight of 115 pounds per yard of rail, which is equivalent to that used by railroads for mainline track and grade crossings at all major public crossings. The conceptual design also assumed that seismic and flood specifications for railbed structure would use national standards contained in the American Railway Engineering Association *Manual for Railway Engineering* (DIRS 106860-AREA 1997, all) (see EIS Section 3.2.2.1.3.1 for a description of the avoidance of wetlands and riparian lands). For cost estimation, specifications for fencing type, ballast requirements, sub-ballast requirements, tie material, train control signal systems, and road crossing signals have been assumed in *Nevada Transportation Study Cost Estimate* (DIRS 154448-CRWMS M&O 1998). DOE used these specifications in the analysis of Nevada transportation activities in Section 6.3.

The life-cycle cost estimates for each rail corridor alternative in Nevada are presented in the EIS Summary, Section 6.3.2.1. The conceptual designs and cost estimates for all five rail corridor alternatives were developed at similar levels of detail and have similar uncertainties, so valid comparisons can be made. DOE anticipates that the cost estimates would change, albeit not substantially, as a result of detailed engineering and design studies.

If there was a decision to proceed with the development of a repository at Yucca Mountain, DOE would determine the type of contractual relationships that would be implemented to construct the branch rail line, if that implementing alternative was selected. As a consequence, DOE is uncertain at this time whether union labor would be used to construct the branch rail line and cannot determine the implications on rural resident employment opportunities. Decisions such as this are administrative in nature and would be unlikely to have environmental impacts.

Though field studies and geotechnical work are needed to determine true cut and fill quantities, quantities have been estimated as a part of the cost estimating process. These quantities have been used in the analysis of branch rail line construction in Section 6.3 of the EIS. As a part of the cost estimate, DOE has assumed that ballast material would be obtained from existing quarries and shipped to the branch rail line by rail (DIRS 154822-CRWMS M&O 1998). DOE would comply with Federal Railroad Administration regulations (see Section 2.1.3.3.2.2), including inspections during construction and operation in accordance with 49 CFR Parts 212 and 213, which require safety inspections by the Administration and allow joint State participation in inspections.

8.6.2 (804)
Comment - EIS000201 / 0002
Build a railroad. Get it off our highways. If you're going to transport it, do the railroad, build it.

I realize that we are not an isolated place in our nation. There are highways like this all through this nation. Little towns, large cities that it will have to be transported to get it to Yucca Mountain.

Again, build the railroad, period. Who cares how much it cost?

Response
DOE has noted the commenter's preference for rail transportation within Nevada. DOE has identified in the EIS the Nevada rail scenario as the preferred transportation alternative in the State.

8.6.2 (3165)
Comment - EIS001195 / 0003
We would expect DOE to work closely with Cortez Gold Mines in designing a reasonable route [Carlin Corridor] through our properties that minimizes impacts to not only our existing facilities and operations but, also to future potential orebodies and associated facilities. We would also expect an assurance that DOE would relocate the rail track at no expense to Cortez Gold Mines should future operational needs require. This is important, as portions of the identified corridor cross some of our mining claims that have not yet been explored for mineral potential. One solution that may be considered by DOE is to cooperatively fund deep condemnation drilling in selected areas.

Response
DOE appreciates the involvement of the Cortez Gold Mines and anticipates working with the Cortez Gold Mines in the event that the Carlin Corridor was selected. The EIS addresses the potential for a land-use and ownership impacts with the Cortez Gold Mine Projects (see Sections 8.1.2.3 and 8.4.2 of the EIS), and DOE would work with

the Cortez Gold Mines to minimize these impacts. Because detailed design work for a rail branch line would be completed at a later time, it is premature to determine DOE's involvement in funding for deep condemnation drilling or relocation of rail track should Cortez Gold Mines future operational needs require such actions.

8.6.2 (6496)
Comment - EIS001241 / 0009
If the alternate rail route alignment of the Carlin route in Crescent Valley would be used, would my land and home be inside or outside the corridor? If inside: exactly how much, and when would I be compensated? If my land and home are immediately outside the corridor, would I be compensated in any way or "merely" exposed to disruption, disturbance, discomfort, inconvenience, and health hazards without compensation?

Response
DOE has developed a conceptual rail design that identifies candidate corridors (DIRS 155022-CRWMS M&O 1997). If a rail implementing alternative was chosen for transport within Nevada, environmental and engineering field studies would be conducted during the rail design phase. These field studies would be used in selecting a final alignment that minimizes, to the extent possible, impacts to stakeholders along the final rail alignment. DOE has included in its cost estimate for rail construction (DIRS 154822-CRWMS M&O 1998) costs for obtaining right-of-way for each candidate rail corridor. Because a final alignment for any candidate rail corridor would be determined at a later date, it is premature for DOE to specify any dollar amount that would be used to compensate any private stakeholder for land within a final rail alignment right-of-way. DOE does not anticipate compensating stakeholders with land adjacent to any final rail alignment.

8.6.2 (9601)
Comment - EIS001888 / 0274
Infrastructure Improvements

The DEIS does not assign specific roles and responsibilities for significant actions. For example, what agency will construct road improvements and facilities, what agency will maintain them, when will these be constructed, when will the NEPA [National Environmental Policy Act] analysis be done. The sparse information contained in the DEIS makes it impossible to negotiate mitigation or even understand the proposed action. The DEIS must specify when construction on infrastructure improvement will begin, what agency will construct and maintain them, and provide a schedule for the required National Environmental Policy Act documentation for the projects.

Response
Roads under consideration for heavy-haul truck transport are under the jurisdiction of the Nevada Department of Transportation (State and Federal highways) and Clark County (the Las Vegas Beltway). DOE anticipates that the Nevada Department of Transportation would perform road upgrade construction activities under its jurisdiction and Clark County would perform road upgrade construction activities under its jurisdiction. Road maintenance would be conducted under the jurisdiction of the Nevada Department of Transportation. Any National Environmental Policy Act activities associated with road upgrades would be conducted in conjunction with road upgrade design activities, *Road Upgrades for Heavy Haul Truck Routes – Design Analysis* (DIRS 154448-CRWMS M&O 1998). DOE's procurement strategy continues to rely on private industry and would seek competitive proposals for the construction of facilities (an intermodal transfer station) associated with transportation. Any National Environmental Policy Act activities associated with construction of an intermodal transfer station would be conducted in conjunction with intermodal transfer station design activities. It is uncertain at this time when DOE would make any transportation-related decision that would indicate when potential road upgrade or intermodal transfer station construction would occur.

8.6.2 (11896)
Comment - EIS001878 / 0087
The DEIS also leaves many unanswered questions, such as:

Would there be one or more sets of tracks, and would there be sidings?

Who would own the tracks, trains, rights-of-way, and support facilities, and who would operate them?

Would all of the tracks and access roads be fenced, or only portions, with what types of fences, maintained and paid for by whom, and owned by whom? How wide would the fenced corridors be? Would consultation regarding fences be limited only to other federal agencies, to the exclusion of agricultural producers, local governments, and public safety officials?

How would the access roads be constructed and surfaced, and who would be allowed to use them?

If roadbed and access roads would be constructed using balanced cut and fill techniques, where would the DOE obtain the fill necessary to elevate many miles of roadbed above anticipated flood levels in Nevada's valleys and playas?

Would blasting be utilized?

Response
As discussed in Section 2.1.3 of the EIS, the conceptual design used in preparing the EIS assumed a single set of tracks and rail sidings (DIRS 131242-CRWMS M&O 1997). Sidings would be an average of 32 kilometers (20 miles) apart and approximately 0.5 kilometer (0.3 mile) long (DIRS 154822-CRWMS M&O 1998). Should the mostly rail alternative be selected, additional, more detailed studies and designs would be conducted for the particular corridor and alignment identified. The need for additional sets of tracks and rail sidings would be evaluated during this subsequent design stage. National Environmental Policy Act reviews, as required, would be conducted at that time.

In keeping with DOE's policy to utilize private industry to the extent possible, DOE would seek competitive bids for the operation and maintenance of a rail branch line. The contractor would be responsible for operation of the rail branch line and for maintenance of appurtenances within the right-of-way, including any fencing that DOE installed. Analysis of fencing location would be evaluated in subsequent engineering and environmental analyses and public and government agency consultations (see Section 2.1.3.3.2.1). Stakeholders would be able to provide comments during these National Environmental Policy Act reviews. DOE would negotiate land withdrawal or right-of-way with the Bureau of Land Management and other responsible agencies for all public land used and purchase required private land. DOE would own all tracks and support facilities, and the operations and maintenance contractor would own or lease all operating and maintenance equipment, including locomotives.

The rail branch line would use balanced cut and fill techniques to the extent possible, however spoil and borrow areas could be needed to establish a stable platform for the rail track (see Section 2.1.3.3.2.1). These borrow and fill areas would be identified during geotechnical surveys that would be conducted during subsequent design stages and evaluated in appropriate National Environmental Policy Act reviews. Rail branch line maintenance roads would be built adjacent to the branch rail line. Maintenance roads would be constructed using a gravel surface and balanced cut and fill techniques adjacent to the rail branch line. Temporary access roads would be used only by the construction contractor during construction and the maintenance roads used only by the operation and maintenance contractor for maintenance and inspection of the rail branch line. Track roadbeds would be evaluated to meet flood requirements established for the detailed design criteria. Blasting would be used as necessary.

8.6.3 OPERATIONS

8.6.3 (3364)
Comment - EIS001242 / 0013
What effects will earthquakes have on the rr [railroad] tracks? The trains, the site and the canisters.

Response
There was an earthquake with a Richter magnitude of 7.4 in El Asnam, Algeria in October 1980. At the time of the main shock a train was straddling the fault. The train was completely overturned. At another site nearby the railroad tracks were bent; it is suspected that this might have been caused by a secondary fault. If a train carrying a shipment of casks containing spent nuclear fuel or high-level radioactive waste was involved in a similar earthquake, the impact on the train would probably be comparable. However, it is not expected that any radioactive material would be released from the transportation casks. They are designed to survive a much more severe shock than that resulting from an overturned or derailed train.